Impact of national legal frameworks on increasing the implementation of small-scale hydro electricity plants (SHP) in Europe – experiences of SMART project

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Abstract

In the project SMART (Strategies to promote small scale hydro electricity production in Europe) from the programme IEE (Intelligent Energy Europe) 7 institutions from 5 European states participate: Province of Cremona – Italy; CESI RICERCA SPA – Italy; Faculty of Mechanical Engineering and Naval Architecture, University of Zagreb – Croatia; Karlovac

Regional Authority – Croatia; Norwegian University of Science and Technology – Norway; Regional Secretariat of Attica - Greece and Energieagentur Waldviertel – Austria. The SMART proposal address to the complexity of the legal/administrative processes to obtain concessions and the economical/financial attraction of private investitors. One of the main objective of the project SMART is to give clear contributions to pull down these non-technological barriers, as helpful tools for European, national, regional and local authority decision-makers for increasing the implementation of small-scale hydro electricity plants (SHP) on their own territory.
Therefore in this paper the results of investigations performed with aim to detection and pull down these non-technological barriers in partner states (Italy, Croatia, Norway, Greece and Austria) will be presented. Investigations include:

- *analysis of inalienable principles regarding the right to use water;*
- *analysis of the normatives about SHP;*
- *analysis of environmental and administrative procedures;*
- *critical review of the different regulations (weak and strong points, most important conflicts linked to the use of water).*

In conclusion of the paper strategies to improve existing regulations (common methodology and tools) will be presented.

Kay words: *programme IEE, project SMART, small-scale hydro electricity plants (SHP)*

1. Introduction

The project Strategies to promote small scale hydro electricity production in Europe (SMART) is from Intelligent Energy Europe (IEE) programme.

The SMART proposal address to important barriers for the expansion of small-scale hydro electricity (SHP) production in Europe: the lack of suitable support methodologies and tools able to create a clear view of the mini-hydro potential in the territory, the complexity of the legal/administrative processes to obtain concessions, and the economical/financial attraction of private investors. Its main objective is to give clear contributions to pull down these non-technological barriers, as helpful tools for European, national, regional and local authority decision-makers for increasing the implementation of small-scale hydro electricity plants. The project will define policies, methodologies and tools to improve water resources management, to better communicate, disseminate opportunities to investors, and to increase the interest of stakeholders to invest in small scale electric plant. 5 representative regions (Cremona County, Karlovac County, Trondheim County, Attica Region, Thaya County**)** in the partner countries (Italy, Croatia, Norwey, Greece and Austria) will serve as learning areas about strategic actions. A mix of disseminating tools, website, contact points, publications, meetings and workshops will be carried out for target groups: national, regional and local authority decision-makers, public operators, investors, end users in general.

In the frame of project the partners will pick up and analyse normatives, institutional procedures and environmental issues assessing the latest developments on the implementation of small scale hydro electric plants in EU/partners countries, identifying the strengths, main obstacles and weak points of existing practices for concessions - will be developed Handbook, addressed to public operators with a critical review of existing normative, institutional procedures and environmental issues to install hydro electric plants.

The main task of SMART project is to reduce legal barriers, through the implementation of clear/standard procedure to obtain the concessions permissions.

2. Inalienable principles

In this chapter are presented inalienable principles regarding the right to use water and the authorization of SHP in different EU/partner countries.

2.1. Italy

In Italy all waters, surface water and groundwater, even though not drawn from underground, are a state property. Public state property includes rivers and streams that are inalienable by their nature. Italian legislation, from the unity of Italy onwards, has basically considered water as a public property capable of generating advantages for the benefit of the prevailing political and economic interests.

The protection of the rights of third parties refers to the protection of the legal title to use water obtained through a concession deed. The grant of concessions must provide for an inspection of the existing uses which must not be, in any way, damaged by the prospective new use.

The principle of solidarity anticipates the concept according to which water resources should be managed according to solidarity criteria and according to the protection of the expectations and of the rights of future generations. The aim is to not endanger water resources, the liveability of the environment, agriculture, aquatic fauna and flora, the geomorphologic processes and the hydrologic balance. The tool is a management of water use oriented towards the conservation and the renewal of the resources.

Competing uses of water states that all waters are a state property, you have to get the permission to use the water before to install a small hydro power plant. Water use concession is always limited in time and is bound both to the need to guarantee the quantitative balance, and to the need to achieve quality standards, according to what has been planned for the catchment basin.

Te works related to hydro power plant construction, as well as the works connected and the infrastructures necessary for the construction and operation of said plants shall be considered of public usefulness; they cannot be deferred and are urgent; this allows starting the procedures for land expropriation.

2.2. Croatia

According to ***the Water Management Strategy***, entered into force in July 2008 as one of the most important legislative document regarding water management in Croatia:

- Water is a public resource which, because of its natural properties cannot be anybody's property and enjoys special protection of the Republic of Croatia;
- Water is the means for life and work and shell be used on conditions according to Croatian legistation;
- Total water resource in Croatia is valuable natural and developmental potential and shall be manage rationally and sustainably;
- Total water need shall be satisfied uniformly and rightfully on the whole state teritory;
- Priorities and criterions in water management shell be difined on state level based on environmental principles as well as a social and suistainable development in accordance with state development policy.

Requirements on water works are the following:

- shall allow returning of water into watercourse or other water body;
- shall not reduce the existing extent of water use for water supply, irrigation and other

purposes;
- shall not reduce the level of protection from adverse effects of water;
- shall not deteriorate the health conditions, conditions of environment, flora and fauna, property and legal interests, pedestrian, road and railway traffic.

2.3. Greece

The Water Framework Directive (WFD) 2000/60 supports the establishment of national and European water policies and strategies. The Directive primarily aims at maintaining a "good ecological status" of water aquifers through the study and application of "management plans" for each hydrological region. The Directive handles the water sector as an entity, while it retains high requirements and specifications for a series of components of the water cycle, such as surface waters, underground and marine waters, ecosystems etc. All the European countries -and naturally Greece- are compelled to conform to this "constitutive map" of waters, in the next years. A number of steps have been taken in the right direction but quite a few issues have not been settled yet. In that spirit, the Directive requires that the true opportunity cost of water resources is covered by the resource users. Such pricing schemes will be introduced in Greece by 2010.

On the basis of the above, a new legislative and institutional framework was introduced in Greece in December 2003. It consists of Law 3199/9-12-2003 (OJG 280A/2003) on the "protection and the sustainable management of the water resources" and the Presidential Decree 51/8-3-2007 (OJG 54A/2007), with which the EU Water Framework Directive (WFD) (2000/60/EC) is transposed into the national legislation.

These laws supplement previous legislation such as 75/440 on the quality of surface waters from which drinking water is obtained 80/778 on the quality of drinking water, 73/404 on pollution of waters drom detergeants, 76/464 on spilling of pollutants on waters, 79/923, 2006/113, 78/659 on the quality of waters for maintaining the life of fish and shells, 80/68, 2006/118 on the protection of underground waters, 91/676 on the protection of water from farming activities.

The mean cost recovery level (for all water uses) for the whole country is estimated at 59.18% but the levels vary according to the river basin districts. The mean precipitation of the Mediterranean European countries is 840 mm/year. Attica's mean inter-annual precipitation is approximately 400 – 450 mm/year. Water resources, hydraulic works and water uses are interrelated and inter-influenced factors, composing the whole water sector of a country. Therefore, a national policy is required for management and decisions.

2.4. Norway

Norway is one of the most developed countries in the world in terms of hydro power, and about 97% of the electricity supply is produced by hydro power. As early as 1877 the first hydro turbine used for electrical power output was installed, and hydro power is considered as the driving force in the industrialization of Norway.

In order to maintain a sustainable water resource management the following user-interests must be considered for each individual project:

- environmental needs with respect to fauna and flora conservation;
- outdoor recreation;
- cultural heritage;
- fisheries;
- drinking water, irrigation and recipient use;
- land reclamation and drainage;
- flood and erosion protection;
- aquaculture;
- hydro power;

- other industrial and commercial uses, e.g. gravel extraction;
- transport sector e.g. waterways, roads, railways.

A river system belongs to the owner of the land it covers, unless otherwise dictated by special legal status. The owners on each side of a river system have equal rights to exploit its hydro power, unless special legal grounds dictate otherwise.

The landowner may oppose others exercising rights to a river system belonging to him without special legal grounds. Within the framework set by the legislation the landowner himself may control the river system provided no special rights are an obstacle to this.

The water authorities may stipulate restrictions on the rights to a property in the interest of a future supply of drinking water that is being planned. Such a restriction may not be imposed for more than five years. The restriction may be renewed once for up to five additional years.

A landowner along a river system may without a licence pursuant to current section in the Act abstract water for his household and domestic animals on the property.

2.5. Austria

In general, surface water in Europe is public property. In Austria, there is a distinction between public and privately owned surface water. This brings about a number of differences according to regulations in the Austrian Water Act (among others for the applications for water use permits, as well as for measures for flood prevention). Private surface water in most cases is owned by the landowner holding the surrounding property – ground water since 1934 is being exclusively treated as privately owned.

But for private property rights on water several restrictions apply – Austrian landowners cannot do with their water whatever they want. For the use of spring water from one's own property, one does not need any official authorization. But each utilization exceeding the owner's own needs requires official permission. If third parties are supplied by a domestic well, permission according to the Water Act is necessary. The administration states in a consensual procedure how much water may be used, expressing it in liters per second.

Property rights in case of flowing private waters refer not only to the river-bed, but also to the water as such. In cases in which the river-bed belongs to a private owner, this does not necessarily apply to the water within it. Mostly, the flowing water is not subject to the owners' disposition unless he holds a permit for its use issued after actively claiming it.

Ownership structures become especially relevant as soon as commercial utilization is planned - for instance by the construction of a hydropower plant. The Water Act also states that private water, whenever public water is fed into it, automatically becomes public water, although the river-bed remains private. Austria's big rivers are all public. The "Österreichische Bundesforste" ("Austrian National Forest Company" – the biggest forest owner) is also considered as the biggest water owner.

3. Analysis of environmental and administrative procedures: authorization to build the SHP

The process of preparing and construction of SHP plant (end other plants using the renewable energy sources) in EU/partner countries is more or less a complex organizational process determined by social, economic, legal, environmental, technical-technological and other factors. The whole process can be divided in various phases, each phase comprising the basic legal acts resulting from activities carried out in a particular phase. For example, in the Republic of Croatia each phase consists of several activities resulting in fact that 19 basic legislative acts request a total of cca 48 activities!

Due to complexity in this chapter as example only Authorization to build the SHP plant in partner countries will be presented considering:

- required application technical documents to submit;
- timing of procedure;
- costs;
- evaluation criteria;
- flow chart of procedure.

3.1. Italy

Required application technical documents to submit After obtaining the over-mentioned water diversion concession for hydroelectric purposes, the concession holder shall submit, to the Provincial Administration of Cremona, a written application for the authorization to build the hydroelectric power plant under decree no. 387/2003. Documents which have to be contained in the application are not described in the decree but are decided from the Province of Cremona on the basis of the passed experiences:

- the Legal person applying and its details;
- the final project of the small hydro power plant that encloses the working plan of the works, all the requirements arisen during the prior concession examination to water diversion and the technical characteristics of the infrastructures necessary to operate the power plant, the type of the turbines and the electrical parameters about power and energy production;
- a report that shall demonstrate the proposed works are innocuous, as regards public water regime and third parties' rights, and shall prove that diverted waters will not damage other existing works or assets in general, neither due to overflows nor due to filtration. The report shall also include the description of the proposed works and environmental impacts of the area;
- a chorography that shall be adequately extensive to allow a reliable positioning of the diversion with reference to the well-known neighbouring places; it shall include the waterway intended for diversion, its surroundings, the drainage basin or basins to use for water collection, the pieces of land to cross with the designed works and their location (scale 1:10,000 and 1:2,000);
- the power electric lines and the substations layout (scale 1:10,000 and 1:2,000) with electrical parameters about power and energy production;
- a tax receipt related to the payment of 1,000.00 euro to the Province of Cremona.

Electric lines are functional work and directly connected to the power station and, thus, fall under the authorization procedure of decree no. 387/2003, but the problem is private applicants do not know this possibility; in fact, they always think electric lines applications could be presented only from the Local Distribution Network Operator; more, private applicant prefer that the electric line's project shall be presented from the Local Distribution Network Operator;

Timing of procedure Under Decree no. 387/2003, authorization time shall not exceed 180 days, time for additional documents excluded, so the real time to give the authorization to build the power plant is on average 1 year.

Costs Cost for the authorization is 1.000,00 euro and it is a tax to pay to the Province of Cremona. Eventually compensation costs are already decided in the procedure to get the diversion permission; otherwise new compensation cost can be requested from a public body during the conference but they have to be well justified.

Evaluation criteria Unfortunately, there aren't clear evaluation criteria fixed in the decree n. 387/2003, because we still waiting a national or regional guide to evaluate the different renewable source's power plants. The only tools fixed from the decree is the Conference of Concerned Bodies (named "Conferenza dei Servizi") that is a way to ask to all competent bodies what they think of the project and which are their questions, in a clear and fixed limit of the time. The meetings of the conference of the concerned Bodies is attended by the Mayor of the municipal territory hosting the power station, the same Bodies that took part in the procedure for diversion concession, the Regional Agency of Environmental Protection (A.R.P.A.) and the Local Health Authority (A.S.L.). A.R.P.A. and A.S.L. are summoned as bodies of technical consultation in charge of environmental protection, safety in the workplace and of assessing the fitness for use of buildings. Other entities are also summoned: the public entities that operate or hold railways, waterways, pipelines, roads, natural areas, parks, etc. that physically interfere with the electric line, as well as the holders of public properties crossed by the line. The authorization depend from the opinions of the Bodies that attend the meetings of the conference, opinions that have to be best objective and related to the project in examination. Under Decree no. 387/2003, the works related to plant construction, as well as the works connected and the infrastructures necessary for the construction and operation of said plants, shall be considered of public usefulness; they cannot be deferred and are urgent; this allows to start the procedures for land expropriation. The authorization shall comprise the obligation to restore the prior conditions of the area; this is to be carried out by the managing entity following plant dismantling.

Flow chart of procedure On Figure 1 is presented flow chart of procedure with times and roles in the authorisation to build a SHP in Province of Cremona – Italy.

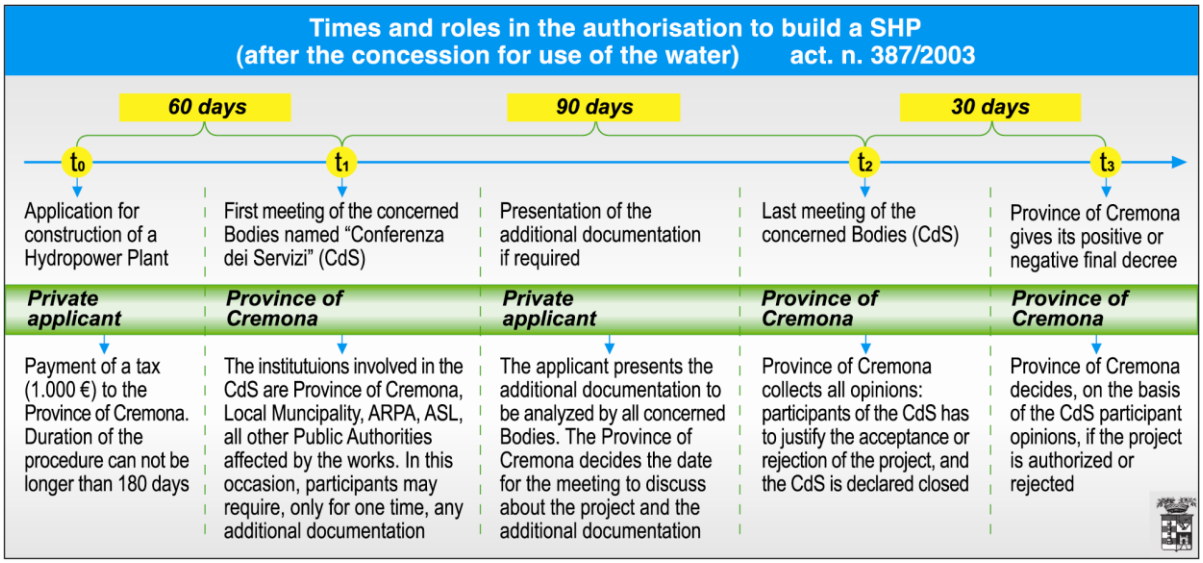

Figure 1. Flow chart of procedure with times and roles in the authorisation to build a SHP in Province of Cremona – Italy

3.2. Croatia

Required application technical documents to submit The group of activities referring to procuring the building permit is considered as phase eight of the Process. The conditions and the procedure for procuring building permit are provided by the Physical Planning and

Building Act (OG 76/07, hereinafter PPBA).

The construction of building having building (gross) area not exceeding 400 m and the building for exclusive performance of agricultural activities having building (gross) area not exceeding 600 m**,** may be commenced based on the final decision on building conditions. The construction of buildings provided by Regulation on Determining Spatial Interventions and Buildings for which the Ministry of Environmental Protection, Physical Planning and Construction (MEPPPC) is in charge of issuing the location or building permit (OG 116/07), may be commenced based on the final building permit (Article 209, paragraphs 1 and 2 of PPBA).

Pursuant to the said Regulation the MEPPPC shall issue the location and building permit for taxatively determined buildings.

Such buildings comprise among others:

- Power plants capacity 20 MW and above with the pertinent facilities;
- Power transmission line 220 kV and above with transformer station and switching equipment on that power-transmission line;
- International and main pipeline for transport of oil, gas, petroleum products, including the terminal, dispatch and measuring-regulation (reduction) station technologically connected with such pipeline;
- Dams with accumulation or retention area with the pertinent facilities meeting the criteria of large dams (Article 2 of Regulation).

Apart of the above mentioned spatial interventions and buildings the Ministry is in charge of issuing the location and building permit for spatial interventions and buildings as well, for which the defining of integral environmental protection conditions is required.

The decision on building conditions and building permit are administrative acts. The construction of other building may be commenced based on the confirmed main design. (Article 209, paragraphs 3 and 4 of PPBA). The simple buildings and works, construction, i.e. performance of which may commence without the act approving construction, is provided for by the Ordinance on Simple Buildings and Works (OG 101/07).

The competent administrative body of the county shall issue the decision on building conditions and the confirmation of the main design for buildings outside the area of big towns and for building located in the territory of two or several self government units, and the competent administrative body of the City of Zagreb, i.e. big towns for buildings on their territories. The MEPPPC shall issue the building permit for buildings referred to in Regulation on Determining Spatial Intervention and Buildings for which the MEPPPC is in Charge of Issuing Location or Building Permit.

The request for issuing decision on building conditions in written form shall be submitted by the client. The request for issuing the decision on building conditions shall be accompanied by:

- Three copies of the conceptual design with situation indicated in special geodetic surveying map;
- Special conditions of the state administration body in charge of cultural assets for building located in the settlement or part of the settlement, entered in the Cultural Asset Register of the Republic of Croatia as cultural-historic entity, or the building has been entered in the register as cultural asset;
- Written report and validity confirmation of the conceptual design if the design has been drafted in line with foreign regulations;
- The evidence of the building right on the land in which the building parcel will be shaped, i.e. on the existing building (Article 213 of PPBA).

Timing of procedure If the conditions provided by this Act have been complied with and if the

client has submitted the evidence on paid municipal service tax and water taxes, as well as building fee pursuant to the special act, the competent administrative body shall issue the decision on building conditions not later than thirty days from the date of receipt of proper request (Article 219 of PPBA).

The decision on building conditions expires if the client fails to commence the construction within the term of two years from the date of final decision. The validity of the decision on building conditions shall be extended upon request of the client for one two years period if the conditions determined in line with the provisions of this Act and other conditions pursuant to which the decision was issued, have not changed. The competent administrative body shall keep the conceptual design and decision on building conditions (Article 221 of PPBA).

But it is necessary mention that entire procedure consists from several phases and activities (please see chapter 3.2.4.5. Flow chart of procedures) and timing of procedure is 240 days but timing of some activities is not defined (denoted with ?).

Because only on two SHP about 10 kW power is performed the entire procedure, the practical experience about real timing of this procedure is very unreliable: it seems that is also longer.

Costs The costs for authorisation to build a SHP can, generally, be divided into:

- costs for SHP environmental conditions;
- costs for SHP building conditions.

These costs are defined on national level and are the same for the whole Croatian teritory.

The SHP exceeding 1 MW_{el} are considered as interventions for which the evaluation of the need for environmental impact assessment should be carried out. The competent body for assessment is the Ministry of Environmental Protection, Physical Planning and Construction. The initial fee for the request for the evaluation of the need for environmental impact assessment is about 100 kn (15 EURO). If the Ministry decises that Environmental impact assessment is obligatory the costs for its preparation depends on current market price as well as SHP performances and should be as high as 300,000 kn (cca 41,000 Euros).

The costs for SHP building conditions consist of costs for:

- location permit - 750 kn (cca 102 EURO);
- special geodetic surveying map – 7000 kn (cca 960 EURO);
- building permit – 0,25‰ of the total price of plant building;
- usage permit - 0,25‰ of the total price of plant building.

Evaluation criteria In the procedure of issuing decision on building conditions the following shall be determined:

- that the building plot is developed within the meaning of Article 125, paragraph 2, i. e. Article 126, paragraph 2 of PPBA;
- place and method of connecting to traffic and municipal infrastructure as well as the other infrastructure;
- that the request for issuing the decision is accompanied by documents referred to in Article 213 of PPBA.

For the purpose of ascertaining the fact that the building plot is developed, the competent administrative body shall, prior to issuing the decision on building conditions, carry out on the spot investigation on the building parcel.

The request for issuing the confirmation of the main design in written form shall be submitted by the client.

The client shall accompany the request for issuing the confirmation of the main design by the following documents:

- Thee copies of the main design with the bound copy of the text of the final location permit,
- Written report on inspection of the main design, if the design control is required,
- Written report and validity confirmation if the main design was designed in line with foreign regulations,
- Survey on geotechnical and other research works, as well as technological, traffic and other surveys, if the data referred in such surveys were used for drafting of the main design,
- Parcelling survey, verified by the body in charge of state measuring and real estate cadastre and confirmation of the competent administrative body which issued the location permit on conformity with the location conditions for the form and the size of building parcel,
- Evidence of the building right on the building parcel, i.e. in scope of the building intervention, i.e. on the existing building (Article 223 of PPBA).

In the procedure of issuing the confirmation of the main design the following shall be determined:

- That the main design is drafted in line with the location permit,
- That the main design is drafted in line with the provisions of the PPBA, regulations adopted pursuant to PPBA and other regulations,
- That the building plot is developed within the meaning of Article 125, paragraph 2, i.e. Article 126, paragraph 1 of PPBA,
- That the request for issuing the confirmation is accompanied with the documents referred to in Article 223 of PPBA (Article 225 of PPBA).

If the conditions provided by PPBA have been complied with and if the client has submitted the evidence on paid municipal utility and water charges, as well as building fee provided for by special act, the competent administrative body shall issue the confirmation of the main design within the term not longer than thirty days from receipt of proper request.

The confirmation of the main design expires if the client fails to commence with construction within the period of two years from the date of issuing such confirmation.

The request for issuing the building permit in written form shall be submitted by the client, who is party in the procedure of issuing the building permit. The client's request on issuing the building permit shall be accompanied by the following documents:

- Three copies of the main design with the bound copy of the text of the final location permit and special conditions which are integral part of the location permit,
- Written report on inspection of the main design,
- Written report and validity confirmation if the main design was designed in line with foreign regulations,
- Survey on geotechnical and other research works, as well as technological, traffic and other surveys, if the data referred in such surveys were used for drafting of the main design,
- Parcelling survey, verified from the body in charge of state measuring and real estate cadastre and confirmation of the MEPPPC, which has issued the location permit, on conformity with the location conditions for the form and the size of the building parcel,
- Evidence of the building right on the building parcel, i. e. within the scope of the building intervention, i.e. on the existing building (Article 228 of PPBA).

Following shall be determined in the procedure of issuing the building permit:

- That the main design is drafted in line with the location permit,
- That the main design is drafted in line with the provisions of the PPBA, regulations adopted pursuant to PPBA and other regulations,

- That the building plot is developed within the meaning of Article 125, paragraph 2, i.e. Article 126, paragraph 1 of PPBA,
- That the confirmations of the bodies and/or persons provided for by special regulations referred to in Article 208, paragraph 3 of PPBA have been procured,
- That the request for issuing the confirmation is accompanied by the documents referred to in Article 228, paragraph 2 of PPBA.

If the conditions provided by PPBA have been complied with and if the client has submitted the evidence on paid municipal service tax, water taxes and construction fee, provided for by special act, the MEPPPC shall issue the decision on building conditions not later than sixty days from the date of receipt of proper request.

The building permit expires if the client fails to commence the construction within the term of two years from the finality of that permit.

Flow chart of procedure On Figure 2 is presented flow chart of procedure with times and roles in the authorisation to build a SHP in Croatia.

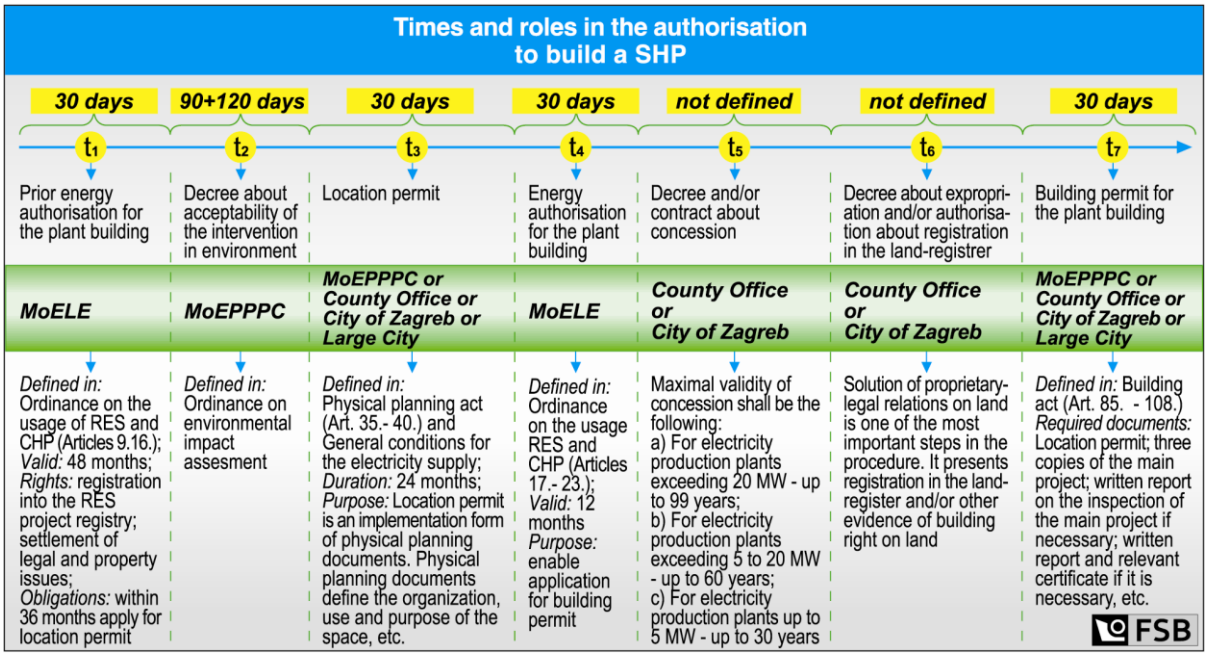

Figure 2. Flow chart of procedure with times and roles in the authorisation to build a SHP in Croatia

3.3. Greece

Required application technical documents to submit For a building permit to the Town-Planning Directorate of the project area Prefecture is necessary submit the following documents:

- Application signed by the interested party (in a special form);
- Declarations (warranties) for the relegation and the undertaking of the supervision study;
- Technical reports and budget (in a special form);
- Installation Permit;
- Topographical chart together with diagram of coverage, in accordance with the stipulations of Presidential Decree 3.9.83 (Official Journal 394/D/8.9.83);
- Architectural design;
- Civil-engineering structural design;

- Heating and insulation design;
- Plumbing and sewage design, where required;
- Electrical/mechanical design, where required;
- Approval of the architectural design by the Town Planning and Architectural Control Committee;
- Passive fire fighting design;
- Active fire fighting designs, where required;
- Gas and fuel handling study, where required;
- Title deeds and recent certificate of ownership from the Land Registry for each terrain/property which may obtain a building licence by exception, or which is located outside the town planning zone;
- Proof of deposit of consultant engineer's fee;
- Reasoned report by the consultant engineer, in accordance with para. 1 of article 3 of the General Building Code;
- Mapping out of the coastline (if the location is situated at a distance less than 100 metres from the shore);
- Approval by the Public Power Corporation for building constructions exceeding 2,500 cubic metres;
- Approval of the Forestry Department in case that the installation is situated in a forest area or in an area outside the town-planning zone;
- Approval of the Ministries of Agriculture and Development in case that state, municipal or communal land is being ceded;
- Approval of the Archaeological Service in case that the installation is situated in areas controlled by the Ministry of Culture;
- Approval by the General Air Staff if the terrain is situated in the vicinity of military airfields or civilian airfields used also by the Air Force and at a distance less than 5,000 metres from the centre of the runway of the airport;
- Approval by the Civil Aviation Authority if the terrain is situated in the vicinity of civilian airfields at a distance less than 4,000 metres from the centre of the runway of the airport;
- Approval by the Ministry of Defence if the terrain is situated in a border region.

Timing of procedure The Joint Ministerial Decision (JMD) 1726/2003 marked a breakthrough in Greece in terms of intensifying efforts to rationalise and simplify the complex and very lengthy licensing procedures for RES-to-power projects. To this date, these procedures constitute today the single, most difficult obstacle in the effective materialisation of commercial-scale RES investments in Greece. JMD 1726/2003 was signed by the ministers of all six (6) Ministries that are co-responsible for the RES licensing procedure, namely the Ministries of: a) Development, b) Environment, Land Planning & Public Works, c) Agriculture, d) Culture, e) Transportation & Communications and f) National Defence.

The JMD covers all three basic (and time consuming) stages of the RES licensing procedure, and more specifically those of :

- Preliminary environmental impact assessment;
- Approval of environmental terms and conditions;
- Approval of intervention on public land.

First, the JMD defines clearly and unambiguously the specific public authorities, agencies and directorates that are required to give an opinion (or to make a decision) regarding the licensing of a RES project. Second, the JMD describes in detail the contents of the opinion, to be given by each one of the above authorities or agencies. Third, the JMD sets strict deadlines for the licensing authorities or agencies, within which they are required to give their opinions about the RES project under consideration. These deadlines have an irrevocable character, i.e. beyond them, the respective authorities, agencies, committees, etc., that have not responded,

are counted as having positive opinions (answers) towards the given RES (Renewable Energy Sources) project, and the licensing procedure moves on to the next stage.

The licensing deadlines, set by JMD 1726/2003, are as follows:

- Preliminary environmental impact assessment : 30 working days (total);
- Approval of environmental terms and conditions : 60 working days (total);
- Approval of intervention on public land: 40 working days (total).

Finally, license for connecting to the grid should be granted within 15 days.

Costs of procedure The following supporting documents evidencing payment of taxes, deductions, and dues.

- Deduction 1‰ of the budgeted cost of the works in favour of the Engineers and Public Works Contractors Pension Fund and 0,5‰ in favour of the National Technical University of Athens according to the provisions of Law 2326/1940 (Official Gazette A 145) with an upper limit of the above amounts €2.93 and €1.47 respectively, according to the provisions of article single of Law 1889/1951 (Official Gazette A 211);
- Deduction 2% of the design fee supporting the Engineers and Public Works Contractors Pension Fund and 1% supporting National Technical University of Athens;
- Payment of 10% of the design professional's fee and especially in the case of the design of provisions of article 11 of Law 915/1979 (Official Gazette A 103) without an upper limit to the amount hydraulic works and surveying jobs 4% to the competent Public Revenue Office as partial advance payment of the income tax according to article 52 of Law 2238/1994 (Official Gazette A 151);
- Deposit voucher with the National Bank of Greece of the design fee in the name of the design professional;
- Stamp duty 2‰ on the design professional's fee, deposited to the competent Public Revenue Office instead of affixing adhesive stamps on drawings, cost estimates, designs and the copies thereof, if any, according to article 25 of Law 2873/2000 (Official Gazette A 151);
- Deposit of €27.88 State tax (account No. 1459) for the electrical and mechanical installation i of the plant owner issued by the Public Revenue Office according to article 2 of Legislative Decree 1150/1949 (Official Gazette A 249), article single of Law 1889/1951, joint ministerial decision 13959/22.2.1952.

Evaluation criteria In Greece there is an RES Special Planning Framework which controls the spatial policies for RES per category of activity and space and establishes the rules and criteria which will allow on the one hand the set up of viable RES facilities and on the other hand their harmonious incorporation in the natural and man-made environment, i.e. through the endorsement of the framework it is sought, in addition to other benefits, a more clear-cut guide to the licensing authorities and the investors, so that the latter will be oriented to installation locations in the first place following the spatial planning perspective. This way, an investor may avoid common ambiguities and conflicting land uses.

Flow chart of procedures On Figure 3 is presented flow chart of procedure with times and roles in the authorisation to build a SHP in Greek.

Less than 200 days			60 days	60 days
Application for generation of electricity	Initial Environ-mental Impact Assessment	Ministerial decisi-on for generation of electricity	Installation license	Operation license
PRIVATE	**GOVERNMENT**	**GOVERNMENT**	**PRIVATE**	**PRIVATE**
Application to RAE RAE evaluates feasibility of project	RAE submits environmental file to Region or Ministry for evaluation File returns to RAE	RAE recommends to the Ministry	Application to Ministry of Development or Region Requires: License to generate, EIA. Offer from the grid operator	Application to Ministry of Development or RegionRequires Completed construction, connection to the grid, contact with the grid operator

Figure 3. Flow chart of procedure with times and roles in the authorisation to build a SHP in Greek

3.4. Norway

The concession for use of the water and concession to build the SHP and its grid connection line is linked together in the same application in Norway. Actually, in Norway the water rights rest with the landowners. The Norwegian Government wants to have information about all aspects of the project before a concession is given.

Required application technical documents to submit In order to achieve an efficient evaluation process it is vital that the application is well organized and contains the necessary information to make professional decision of the current project. NVE (The Norwegian Water Resources and Energy Directorate) has derived a template which illustrates how the application should be organized and what information which must be included. The application template is divided according to the following main chapters:

- Introduction: Location of the project, list of all the involved landowners, existing interventions, comparison of adjacent drainage basins and river course;
- Description of the initiative: Main data, technical plan, cost estimate, advantages and disadvantages, tenure, relation to public and national plans, alternative solutions;
- Effect on environment, nature resources and society/community: Hydrology, Biological diversity, Fish and fresh water biology, Flora and fauna, Landscape, Culture heritage, Agriculture, Water quality, User interests, Power lines and grid connection, Lapp interests, Keeping reindeer, Consequences related to dam and pipe line rupture, Consequences related to alternative project solutions;
- Initiative for diminishing damage;
- References;
- Attachment to the application (Maps, durations curves, photographs, overview of the affected land owners, agreement with the current grid company if existing and an environmental report which sheds light on the biological diversity/fauna/fish).

Furthermore, the following documents must follow the application: “Documentation of the hydrologic conditions” and “Classification of dams and pipelines”. If the projects attains a classification other then 0, it requires that certified consultants are involved in the projecting.

"Documentation of the hydrologic conditions" - Involves a thorough description of the hydrology before and after the development in order to emphasize the impact.

"Classification of dams and pipelines" - Involves a calculation and description of the consequences in case of dam and/or pipe line rupture. This is important in order to emphasize the safety aspects and environmental impact in case of rupture.

Certain measures must be carried through if the consequence of a rupture is substantial i.e damage on railways, roads, houses etc.

Pursuant to the Energy Act, an application shall be submitted to the licensing authority. For applications that are covered by Chapter VII- of the Planning and Building Act no. 77 of 14th June 1985, an environmental impact assessment shall be submitted with the application.

The application shall provide the information that is necessary in order assess whether a licence should be granted and which conditions shall be specified. The Ministry may specify the information or studies that the applicant must provide.

An application for the construction of an installation for the generation, conversion and transmission of electrical power shall usually be submitted simultaneously with the application for power plant development in accordance with the water resources legislation.

The reconstruction of watercourse installations with a licence pursuant to section 8 may take place without a new licence if the work is initiated within five years of the time the installation became inoperative and is completed with reasonable speed. The water authorities may extend the deadline once.

Once central public authorities have instituted preparation of a master plan for the use or protection of river systems for a larger area, the water authorities may without further consideration delay or reject an application for a licence that pertains to a river system included in the scope of the plan. A licence may be granted only if the measure is without appreciable importance for the plan.

When a plan as mentioned in paragraph 1 is completed, the processing of applications for licences shall be based on it. An application that is at variance with the plan may be rejected without further consideration. Only the Ministry may grant a licence for measures in a river system that may reduce the hydropower in river systems that are assigned to power development in the plan.

A master plan for various measures within a single river system should preferably be drawn up pursuant to the rules in the Planning and Building Act. Measures in a river system subject to a licensing requirement must have a licence pursuant to this Act, and legally binding plans pursuant to the Planning and Building Act may not substitute for a licence.

An application for a licence pursuant to section 8 must, in accordance with regulations pursuant to section 65, provide the necessary information about the planned measures and the advantages and disadvantages connected therewith and about the relationship to legally binding plans pursuant to the Planning and Building Act. The water authorities may require further information from the applicant and may decide that the applicant must undertake or defray the cost of studies or reports required to ascertain the advantages or disadvantages of the measures. For measures that fall under the rules relating to environmental impact in the Planning and Building Act, these rules apply instead.

If measures in a river system can cause substantial damage or nuisances, the impact assessment must consider relevant alternatives such as a different site, different technical solutions or a different design. If the measures will have an impact on the use of the river system in other respects, the assessment must clarify such impacts.

The application is subject to public disclosure in accordance with the rules in the Freedom of Information Act. Public notice of the application must be made at the applicant's expense according to the rules in section 27-1, no. 2, of the Planning and Building Act. The

water authorities may exempt the applicant from the public notice requirement if:

- The matter can be completely notified in some other way;
- It is evident that consideration must be postponed pursuant to section 22, or
- It is evident that the application must be rejected.

A licence may be granted only if the benefits of the measure outweigh the harm and nuisances to public and private interests affected in the river system or catchment area. When measures are of a permanent nature or may for other reasons have longer-term impact, the requirement in paragraph one must be met in the longer term.

In a licence, terms and conditions may be set for counteracting harm or nuisances to public or private interests. The emphasis must be on promoting safeguards against harm to people, property or the environment, ensuring that the measures are as well adapted to the landscape as possible and maintaining the natural aquatic life. Terms and conditions may be set for *inter alia:*

- Safeguarding against harm through design and functional requirements and requirements for the necessary maintenance of watercourse installations;
- Ensuring clean-up or restoration when the measures are closed down;
- Adapting the measures to another relevant use;
- Allowing others to be participants in the measures in the river system;
- Mitigating damage and nuisances connected with older measures in the river system, including the reopening of streams, re-establishment of edge zones and other restoration of natural areas, if this is reasonably connected with what the licence pertains to.

If measures in a river system can impact the rate of flow and water level, limits shall be set for the water level and rate of flow in accordance with section 10, with the necessary mandates for compliance monitoring, and, if necessary, instructions shall be issued for how reservoir operation is to take place. In a licence for measures in a river system that may impose substantial inconvenience on other utilisation of the river system or catchment area, terms and conditions may be set for the developer to facilitate such utilisation elsewhere or provide subsidies for this purpose.

Timing of procedure It is vital that the process focuses on the project's most important aspects: whether or not to grant a license, choice of the right alternative and stipulation of conditions including the rules of operation. The procedures require that the relevant authorities and public are involved in the process at different stages. For smaller projects without notification time for the licensing process takes from one year to five years, with two/three years on average. For larger projects with notification the procedures take from two to six years or more. The time needed for approval depends on how controversial the project is, the time used on EIAs, the working capacity of the competent authorities and whether the fixed time limits for comments on the notification and the EIA can be met. Some steps during the process are also dependent on initiatives from the developer.

Costs **Concession fee:** Regulation of a river system involves economical obligations for the affected municipalities. Hence, the owner of the power plant will be charged a so-called concession fee to the municipalities affected by the development.

Ordinary Taxes: Ordinary taxes related to the trading profit.

Installation fee: A payment to the current grid company to cover any costs related to the new grid connections or reinforcement of the grid.

Variable production cost: A cost which constitutes of feeding cost, grid cost and sales cost to the current grid company.

Economic rent taxes: In 1997 the economic rent taxes related to hydro power was introduced in Norway, and amounts to 30 %. The economic rent is a taxation paid to the government. It is

a calculated standardized market value of the production during one year of operation, where operating expenses, concession fee, property tax and depreciation are deducted. In addition, a part of the revenue is deductable to prevent that normal profit is charged with economic rent. Also, the economic rents only yields for installations larger than 5 MW.
Other compensation: Land owners affected by the development may also be compensated because their property has been exposed to intervention, e.g. roads, rig area, etc.

Evaluation criteria In Norway, since the water rights rest with the landowner, competing applications related to the same river is not often a subject.

However, if there exist applications for several rivers in the same region, the authorities have to evaluate which of the projects that will have the greatest benefits (Socio-economic, social etc) with smallest interventions in the nature. The effects of all the SHP together must be evaluated, and in most cases only a selection of the projects will be authorized.

Also, it is possible to apply for transferring of water from one drainage basin to another to increase the available water in the current river, and this may be in conflict with other SHP projects and/or irrigation system by reducing the inflow in adjacent water falls. However, also for this scenario the authorities have to consider the benefits versus the disadvantages.

Furthermore, SHP which involves special conflicts related to the following subjects will not be prioritized:

- Fish, especially salmon;
- Cultural heritage;
- Preserved area;
- Agriculture;
- Biologic diversity;
- Vulnerable species, etc.;
- Visual effects and outdoor recreation.

In order to promote development of small hydro power it is vital to increase the financial support to R&D and provide comprehensive information to both public and private participants. Today there is no financial support related to electricity production from hydro power.

Thus, introduction of financial support for hydro power will act as a catalyst for future development. Furthermore, the following topics will be important when considering evaluation criteria:

- Time aspect, from application to license granting;
- Technical considerations with respect to the quality of the equipment, not only focus on safety and environmental aspects;
- Requirements versus the degree of intervention;
- Costs related to composing of the application;
- Feedback from NVE and the body entitled to comment.

Flow chart of procedure As mentioned in some cases there may not be necessary with a license, and the applicant applies to exemptions of a license, and the procedure is presented on Figure 4.a.

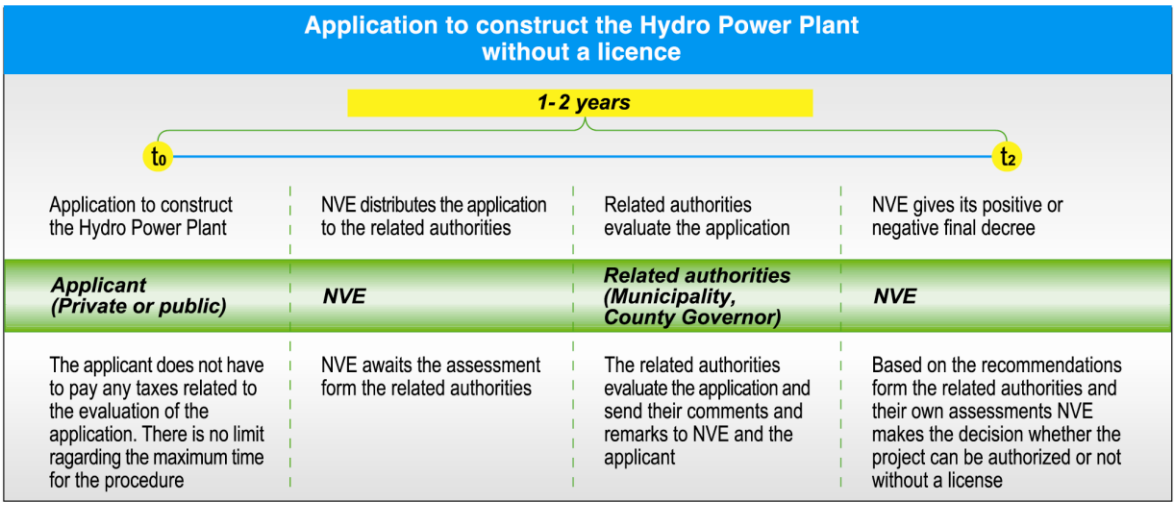

Figure 4.a. Flow chart of procedure, without a license

However, if the authority does not authorize the development of hydro power without a license the applicant must decide if he wants to go further with an application for a license, and the procedure is presented on Figure 4.b.

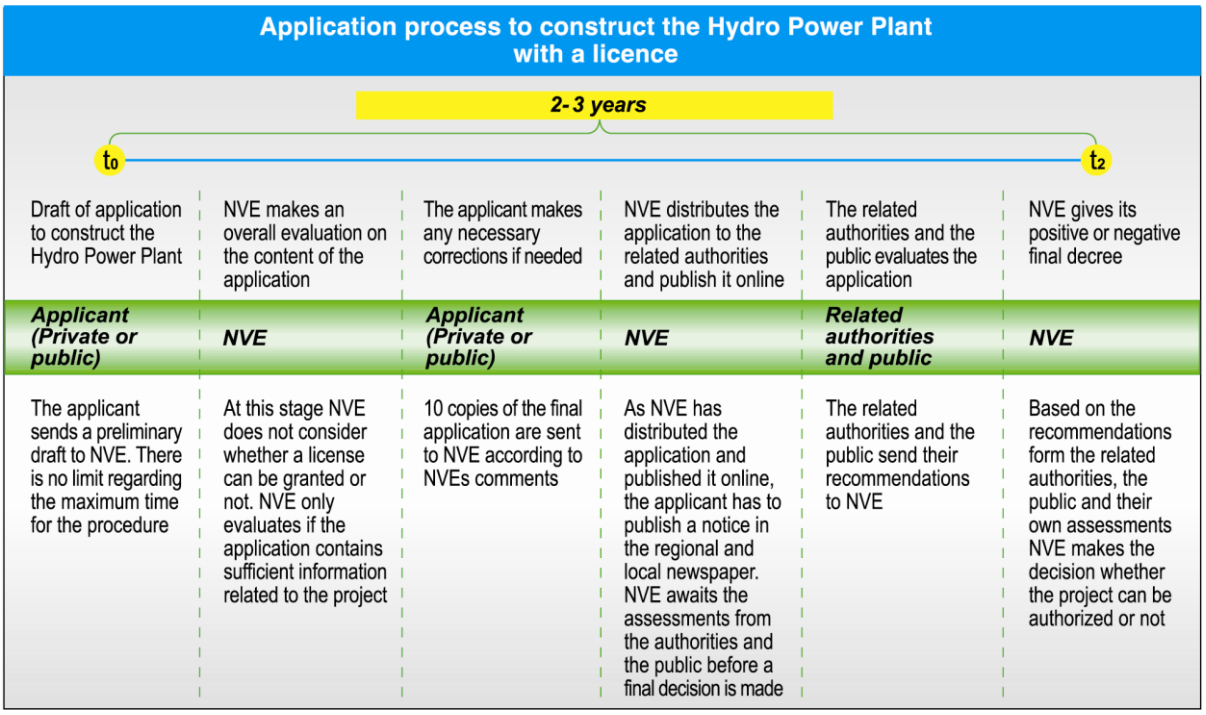

Figure 4.b. Flow chart of licensing procedure

3.5. Austria

The permit procedure for water utilization is usually carried out together with the permit procedure for the construction of the SHP – "concentrated procedure". Therefore the following specifications about time response and costs as well as the flow chart are for both blocks (water utitlisation and SHP) the same.

Required application technical documents to submit For institution of the permit procedure

are at first to bring forward a advising and than an application to the authority. Required project documents are normally plans, descriptions and expertises. How these documents have to be designed and if eventually also certificates, protocols or something like this is necessary, is to be decided by the authorised experts of the individual procedure – in the course of the expertise. There are no general parameters for that.

Conditions for establishment of barrage and weir facilities:

- Construction measures have to be undertaken in consensus with the land-owners and the department of riparian construction (WA3) of the Lower Austrian Land administration.
- At least a fortnight before inception of construction works the holders of riparian rights (those located nearest downstream and upstream) and the holder of fishery rights. In case construction works will possibly be of temporary influence for these right holders, consensus with them has to be reached and eventual damage has to be repaired.
- During the course of construction works one has to prevent any sort of substance harmful to fishery and water quality from flowing into the watercourse.
- Construction management has to secure that even in case of flooding all the water can flow away without causing any damage.
- The erection of all kinds of facilities necessary for the construction site and the storage of construction and excavation material are forbidden, and so is the parking of construction vehicles within the boundaries of the flooding danger zone. In case of upcoming floods necessary measures need to be taken immediately.
- After termination of construction works, the flood profile zone has to be abandoned entirely and without delay.
- Eventual field damage have to be re-compensated following the guidelines of the Lower Austrian Chamber of Agriculture.
- Banks and bottom have to be put in good order again taking into account frictionless integration into existing landscape structures with the least possible flow-resistance.
- Embankments which are not secured in a special way, are to be equipped with humus and grass needs to be planted on them.
- Existing parts of barrages and wooden pilots either have to be removed, or they must be cut at the level of the river-bottom.
- The barrages have to be tightly and deeply connected to the ground and the appearance of potholes has to be prevented.
- One has to deliver a proof of the stability of the barrage construction and a civil engineer authorized for this field has to approve it. The opinion has to be handed to the authorities which will keep it in public evidence.
- All facilities must be prevented from access of unauthorized persons and secured against manipulations by such persons.
- Only authorized enterprises may carry out the relevant work.
- The relevant security instructions have to be followed during construction and operation.
- Operation piers, side walls in the vicinity of the barrage and other places of hill-slide danger have to be secured by railings or safe coverings.
- All required height level marks have to be installed according to the water storage level regulation. A protocol on the installation of the storage water height mark has to be presented to the authority.
- For each facility, an operation guideline has to be elaborated containing a list of maintenance measures and of measures against icing and their intervals, too. Reference to the regulation and alarm equipment has to be given. This guideline also

has to comprise an instruction about the opening of the bottom drain and the barrage flaps for the purpose of bed load transport. The instruction has to be presented to the Riparian Rights' Authority prior to putting into operation of the plant.

- In case of any alterations during the construction phase, all such changes have to be documented in the documentation for technical acceptance together with a technical description and some plans.
- The plant operator has to nominate a reliable person in charge of operation and a deputy person as well. They must be permanently available; the authorities must be given their phone number.
- The barrages have to be kept free from ice and log jam.
- An unlockable opening has to be foreseen in order to guarantee a required minimum flowing water throughput which must remain in the river-bed. It must be safe from log-jamming. A hydraulic proof for this opening has to be presented in the acceptance protocol.
- All part of the plant have to be maintained in an impeccable and statically stable state.
- The applicant for a permit is in charge of the maintenance of the banks in the storage zone and in the area of in-built equipment as well as of measures for the protection of equipment. Moreover he has to secure that the drain bottom remains free from log-jams and sand-banks. He has to remove flood disaster damage immediately.

Conditions for hydropower-plants (water ecology):

1. A construction surveyor for riparian affairs has to be nominated for implementation and controlling of all measures of projects for minimization of hydro-ecological impacts, as there are for instance
   - Construction of the fish bypass;
   - Erection of the bottom-deepening area in downstream direction;
   - Measures in the intersection between upstream flowing watercourse and storage area;
   - Design of storage area;
   - Measures for stabilization of banks.

   It is necessary to document activities.
2. Whenever the SHP station is to be built in a watercourse bypass, it has be ensured that in the remaining water-body beside the by-pass a minimum water throughput (indicated in liters per second) will be maintained all year long. According to the specific needs of the dominating fish species and their ovulation periods, the amount of water throughput to be left within the original watercourse has to be specified individually for different periods of the year. All the quantity of watrer which has to be left in the original river-bed has to be led through the fish-bypass in order to create sufficient current attracting fish to use it.
3. Fish-bypasses have to be installed in line with the project documentation and the plans contained in it, respectively according to specifications in expert literature. After its construction an expert has to assess its functioning and if necessary, the construction has to be changed according to practical needs – for instance effective height has to be changed.
4. For regular control of the operators' abiding by the prescribed minimum amount of remaining water, alongside the barrages measuring and controlling devices need to be installed (e.g. Thompson-weir or similar).
5. After completion of the construction works, the Riparian Rights Authority is to be presented with plans based on constructed reality, giving details on:
   - Deepening of river-bed downstream;

- Design of storage area;
- Measures for stabilization of banks.

6. The operation guideline oft the SHP plant has to contain a chapter on the regulation of the river-bottom outlet created for easy transportation of bed-load resp. on eventual leaching away of bed-material in case of water throughput exceeding medium quantity (from Q > MQ onwards). This prescription serves in particular fort he maintenance of bed-load transport and the avoidance of potentially harmful outleaching of the storage area.
7. In run-of-river-hydropower stations all downstream sand deposition has to be restricted to the area of the turbine outlet on one hand so as to guarantee the keeping of the required effective height, and on the other hand in order to avoid large-scale interventions into the river-bottom substrate in downstream direction.
8. Material taken out when cleaning the upstream grid has to be disposed of properly. The proper disposal has to be proven. By no means the material may be disposed of in the outlet section or in downstream river sections. If another procedure is chosen, good reason for doing so has to be provided.

Timing of procedure For the whole concentrated procedure – max. 6 months.

Costs (taxes, procedure fees, other compensation costs)

- application 13.20 €
- plan 7.20 € per plan
- attachments 3.60 € per A4
- negotiation 9.45 € for 30 minutes
- national fee 27.20 to 327.00 €
- check of implementation 9.45 € for 30 minutes
- decision after checking 6.50 €

Evaluation criteria As the procedure is carried out in a concentrated form, the evaluation criteria for the permit to use water also apply for the permit to build a SHP: Basic criteria for permit are:

- ecologic situation (§105 water law);
- public interest concerning water utilisation (§12 water law);
- ecologic efficiency (§ 7 nature and landscape conservation law);
- landscape conservation (§ 8 nature and landscape conservation law).

Flow chart of procedure The flow charts for obtaining the concession for the use of water and authorisation to build a SHP are in one pice because these two approval procedures are being dealt together in one procedure by the authorities in region Lower Austria – Figure 5.

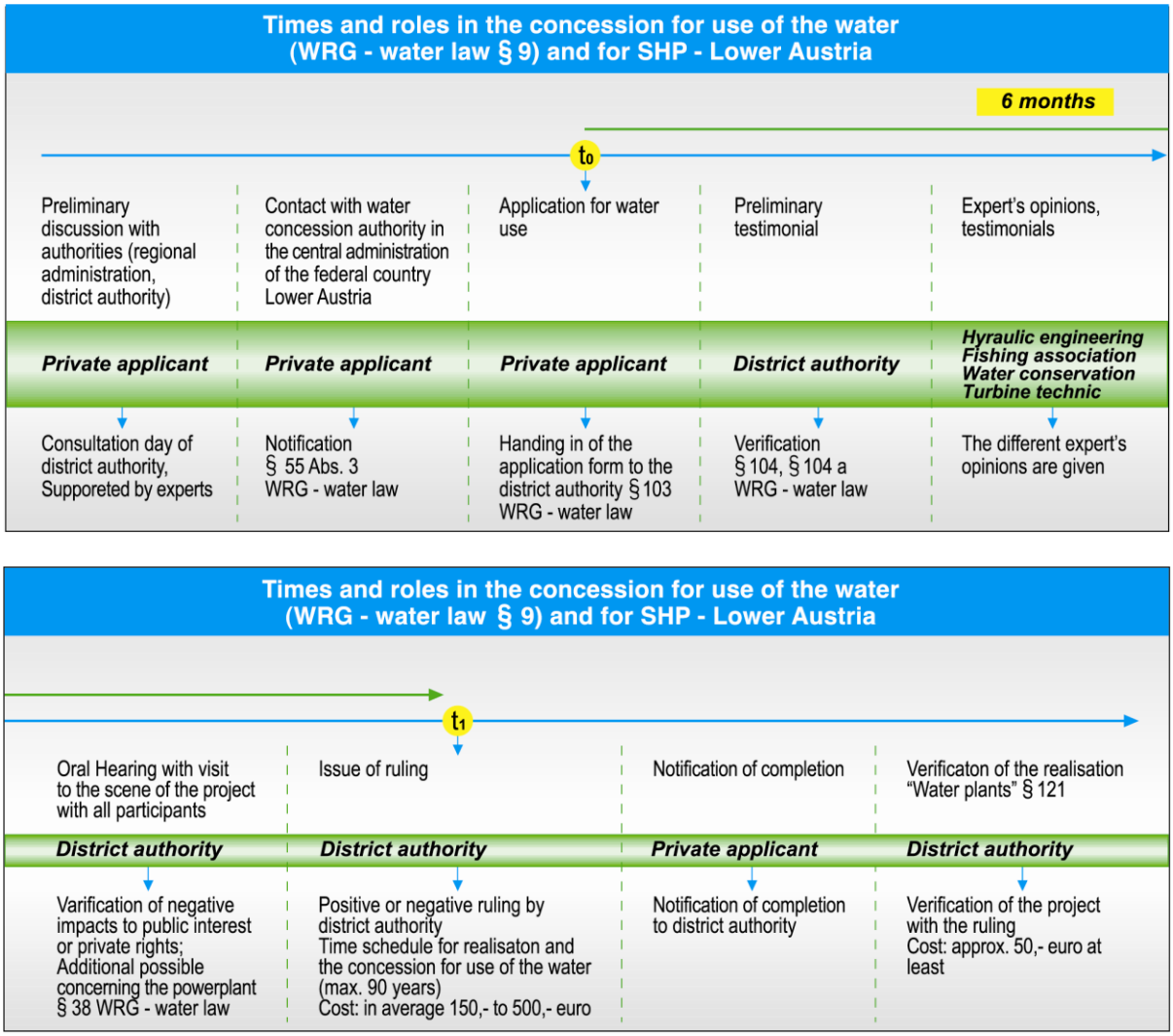

Figure 5. Flow chart of procedure with times and roles in the authorisation to build a SHP in Austria

4. Critical review of the different regulations

In this chapters partners analysing environmental and administrative procedures (environmental impact assessment, obtaining the concession for use of the wter, authorization to build a SHP, authorization to build the electric line of SHP – procedure to connect the plants to the grid) have detected different as weak and strong points of the different regulations so most important conflicts linked to the use of water.

4.1. Italy

Weak points of the different regulations

a) No substantial differences exist between the concessions for micro/mini diversions and large diversions: this is the first non-technological barrier to the development of mini hydropower plants because the general procedure for granting water use concession is rather complex both as regards the documents to submit and the procedures to go through; the applicant is thus required to bear a considerable economic commitment which makes some types of plants (mainly micro hydropower plants up to 100 kW) economically unsustainable.

Among them are the micro hydropower plants, located along secondary water networks created for irrigation purposes, that do not take water away but return it at an elevation useful for irrigation. Often, micro power plants are only aimed at self-generation and are connected to the power box of the house located in the area of the power plant; the low levels of energy generation added to the considerable difficulty to obtain water use concession lead the people interested to give up the idea regarding it as economically unsustainable.

b) The thresholds for the regional checking of EIA are too low: as regards the EIA procedure, it would be interesting to propose thresholds that are different from the existing ones, which subject the plants to the environmental impact assessment procedure. Currently, the threshold for the checking procedure is equal to 200 l/s, if the plants is located into a protect natural area, the 200 l/s threshold is halved and power plant project goes directly to the EIA; the respective procedures require the submission of a considerable amount of documents aimed at assessing the impact of, often, small-sized plants, run-of-river types, that immediately return water downstream of the water diversion barrier; it is clear that, as regards water exploitation for energy generation, the advantage for the firm is much greater than the impact of plant construction. The criteria according to which the plants are subject to checking should be changed and, in this case, connected not only to water quantity but also to how water is derived and returned.

c) Compensation costs are not defined: such costs, connected to the examinations, consist of a payment of a fee related to the granting of water use concessions (extra-fees), and of a compensation for the environmental "damage", less explicitly provided for within the regulations concerning the competence of the managing bodies of Parks and Municipalities. Precisely, the Bodies and the Municipalities cause the increase of the costs of plant construction, as they require considerable and unexpected compensation costs, both in terms of amounts and application rules. The lack of a real definition of the compensation costs required by the Bodies and the Municipalities may make similar plants on the same site more or less feasible, in terms of soil occupation and impact caused by the construction of the plant.

d) Uncertainties on the data regarding water resources: one of the aspects that limits the development of mini hydropower is due to the uncertainties regarding water resources: Italy lacks a technical data bank capable of supplying data regarding the flow rates of exploited water resources, which are fundamental in order to take a technically and economically sustainable decision. The available data are not always certified, they are often disagreeing and almost never supported by a precise reference to their origin; in this respect, it should be emphasized that the Italian national regulations consider ISPRA (Institute for Environmental Protection and Research) the national agency in charge of technical-scientific tasks and activities at national level as regards environment, water and soil protection. Among such activities are the competences originally entrusted to ANPA (National Agency for Environmental Protection established under law 61/94) and then merged, along with the national technical services, in APAT (Agency for environmental protection and technical services) first and recently in ISPRA. Among its tasks are the regular collection and publication of all environmental data, also through the carrying out of the environmental monitoring and information system. However, ISPRA only provides the environmental yearbook which comprises the data resulting from the monitorings supplied by regional agencies (ARPA, APPA, Regions, Autonomous Provinces, Land Reclamation Consortia); giving a look at the flow rate reports, you realize that, all over Italy, only 5 flow monitoring stations of the main rivers are, in fact, examined; thus, this information cannot be used due to the need for accurate analyses regarding the optimal sites to build the plants. If you want to refer to the data available at local territorial Bodies (ARPA, APPA, Regions, Provinces and Land Reclamation Consortia), you have to cope with the not homogeneous data archives and administrative management of such bodies, which, in many cases, have not yet achieved the

power to fully carry out their peculiar functions as prescribed by law. The consequence is a not homogeneous and not in the least clear national framework, mainly to those private entities who intend to work on the territory.

e) Uncertainities on the minimum flow rate to release in the river bed (Reserved Flow – hereinafter DMV): the lack of reliable data on the real availability of surface and underground water directly causes difficulties in carrying out proper quantitative assessments on the required site (definition of the reserved flow) and the relevant subsequent monitoring of releases. In particular, having reliable flow data is deemed necessary in order to correctly determine the hydrologic component of the DMV, bearing in mind all the serious consequences for grantees in case of overestimate. In some regions, the extreme consequence of such lack of technical knowledge has led to the delay of diversion authorizations, thus transferring to the PTA (Water Protection Plan - WPP) the theoretical assessments regarding the definition of the DMV of a waterway; on the contrary, in other regions (Valle d'Aosta), the regulations for granting new mini hydropower plants state that the applicant is in charge of carrying out the monitoring of the volume of flowing water in the river bed for at least two years.

f) Non-implementation of the obligation to install flow meters: under the Consolidation Act on water no. 152/06, the Ministry of the Environment should issue the guide lines and the regions should define the technical specifications for the installation and maintenance of (compulsory) devices to measure flow rates and derived public water volumes next to withdrawal spots and, where existing, next to the spots where water is returned, as well as the methods to pass on the results of the measurements carried out by the granting Authority. As these provisions, which would surely reduce the existing uncertainties regarding the availability of basin water resources, have not been issued yet, water concession grantees currently stick to the technical directions contained in the rules and regulations of the individual concession order as regards flow rate measurements, or, on their own initiative, they propose technologically advanced projects which are welcomed by the granting Authority; the guidelines are needed as soon as possible.

g) Legislative decree no. 387/2003 has not been fully enforced yet: the decree at issue has been approved in order to rationalize the authorization procedures to build and operate power plants for the generation of energy from renewable sources, including hydropower plants of any capacity. The decree has introduced an innovative tool – the use of the Conference of the Concerned Bodies, meant as a useful opportunity to gather all the bodies involved in expressing their opinion. The art. 12 of the over-mentioned decree gives the possibility to authorize also the construction of the works directly connected to the power plant, such as the long-distance power lines necessary for Grid connection. So, in most of the cases dealt with so far, the Conferences of the Concerned Bodies have only authorized the hydropower plant and have referred the authorization for the necessary long-distance power lines to subsequent examinations. This happened because in the cases dealt with in past years, the firm had submitted only the project regarding the power plant and only later had it submitted the application for the authorization to build the long-distance power lines; in that way, it transferred such burden to the local power company (e.g. ENEL). In the past years, such behaviour has led to wait at least 180 days in order to obtain the authorization to build the power plant and further 180 days to obtain the authorization to build the long-distance power line, without considering the so-called "dead" time for the submission of possible integrations which have allowed the applicant to build the plant at least 1 and a half year after the submission of the authorization application.

h) The relevant authorities are not well identified: decree no. 387/2003 has been approved in order to rationalize the authorization procedures to build power plants for the generation of energy from renewable sources, but it has not precisely indicated the relevant

bodies in charge of expressing an opinion according to the technology to authorize. The risk is to involve the useless bodies and not to involve relevant authorities.

i) Fixed prices regarding Grid connection: the recent resolution no. 99/08 of the Regulatory Authority for Electricity (hereinafter A.E.E.G.) has introduced some important innovations as regards the private entities who apply for the authorization to build both the power plant and the long-distance power line. The private entity can also submit the authorization application to modify the existing public Grid to the provincial offices, whereas such application is usually submitted by the power company. The power company and the private entity can reach an agreement so that the private entity submits both the applications to modify the Grid and to build the power plant. After obtaining both authorizations, the private entity refers back to the power company and requires the construction of the authorized works and a detailed quotation. The initial assessment of the formulas comprised in the over-mentioned resolution reveals that the quotation required by the power company is, on average, higher than the quotation that was required before the introduction of such resolution.

j) Duplication of procedures: the applicant who wants to build a hydropower plant shall go through at least three different examinations: obtaining the water diversion concession, building and operating the hydropower plant and the authorization to build the long-distance power line; each of the over-mentioned examinations requires different costs, time and documents. The damaging aspect of such situation is mainly due to the involvement of the Bodies: as regards each of the three over-mentioned examinations, the bodies involved and required to express their opinion are almost always the same, such as the relevant Municipality, ARPA, Land Reclamation Consortia, ASL (Local Health Authority) and the Managing Body of the Park, if applicable, and every time, they are asked to analyze a single step of the general project. It is clear that the general project shall include references to the works connected to the operation of the plant, the environmental impact and the administrative and legal implications connected to its construction. Even though they will be differently investigated by the three examinations, such aspects must be already included as fundamental elements of the project and thus they must be already assessable in advance by such Bodies. The Bodies involved are required to express their opinion on the same project but in different examinations, thus duplicating the activities of the bodies required to express their opinion regarding other procedures; so, in Lombardy, the Region has made an effort to coordinate the procedure of concession granting with the environmental impact assessment procedure, identifying common stages for the two examinations; thus, we believe there may be the conditions for an improvement of the state of the art. Procedure 387/2003 may also be used for water diversion concession in order to standardize the procedures, and, thus, it may be updated with regard to mini hydropower.

l) The guide lines regarding the documents to submit are non-existing: the existence of several procedures, that despite assessing the same project, are characterized by such regularly marked administrative steps and time, forces the applicants to continually submit integrations to the documents. The aspects assessed each time not only extend the time and make costs heavier, but they may also trigger a vicious circle within which there is an ongoing request for integrations in order to correctly assess one of the several aspects tackled. This often leads to carry out changes to the initial project such that two problems may arise: the first problem is that the Bodies assess and express their opinion on projects that are different from one another because they have been integrated following examinations carried out at a different time, and the second problem is that it may be the case that the changes carried out each time lead to a considerable alteration of the original project, which, according to the regulations, shall be subjected once again to the whole procedure. Thus, it would be extremely advantageous to identify a guide line for the drawing up of the applications which, as far as

possible immediately, take into consideration all the aspects that can be assessed by the Bodies involved. The lack of a guide line concerning the documents to submit regards not only the procedure for the granting of the water diversion concession for hydroelectric purposes, but also the procedure regarding the granting of the authorization to build and operate the plant (Legislative Decree 387/03); currently, the offices that are relevant in each case are left in charge of deciding which documents they require. Clearly, this aspect, emphasized by the not homogeneous national framework with regard to the distribution of functions, leaves room for unequal treatment of similar applications.

Strong points of the different regulations

a) Water is considered a public resource: this principle, already often mentioned in the previous chapters, assures that water exploitation is connected to the principles of public administration: sustainability, conservation, efficiency and rationality. The over-mentioned aspects cannot be pursued if water use turns into a good to be purchased which, as such, would be exploited in order to create profit for the only benefit of its owner. Considering water a resource necessarily requires a broader management that can only be carried out by the public administration. That is why water use concession does not modify the public nature of water; the public administration may coordinate further uses of water and endorse the principle according to which in case of conflicting applications the project that provides for the most rational use of water resources shall be chosen.

b) Existing regional regulations that can be improved: the State has devolved the functions described in chapter 3 on the Regions; some Regions, in turn, have devolved such functions on the Provinces, also by approving regional regulations. As regards Regione Lombardia, the regional regulations have introduced some procedural facilities that deserve being mentioned and, in case, adopted by the national legislation.

c) Public use of authorized works: legislative decree no. 387/2003 entitles to declare the hydropower plant and its associated works of public use, urgent and undelayable, such as, for example, the long-distance power line. If necessary, such terms may speed up the procedures to expropriate the estates concerned by the works, avoiding delays and long-term lawsuits; however, it is desirable that the firm reaches a positive agreement with the owners before applying for the authorization to build the power plant;

d) Changes to the current urban building plan: the final action that authorizes the construction of the hydropower plant for public use directly modifies the town plan, even though the power plant is not envisaged;

e) Below 100 kW the D.I.A. applies: under art. 2 par. 158 of law no. 244/2007 that has amended art. 12 of legislative decree 387/2003, hydropower plants up to 100 kW are subject to the rules and regulations governing the Declaration of Work Onset (hereinafter DIA); thus, as regards such plants, the Municipal Administrations can neither demand the applicant to apply for a construction authorization, nor can they claim complex and burdensome requirements;

f) Penalties are established for the power company: as regards decree 99/08 of AEEG, for the first time penalties and infliction methods are established if a power company is inactive or is late in supplying the General Minimum Technical Solution - STMG to the applicant. This will spur the local power company to reduce the time necessary to produce a quotation related to the Grid connection of a hydropower plant and to carry out the complete connection.

g) The owner of the plant can also receive authorization as regards the power line: there is a third way to receive authorization for both the mini hydropower plant and its long-distance power line: the private applicant shall submit both the hydropower plant project and

the long-distance power line project under decree no. 387/2003. So, before submitting the two projects (regarding the power plant and the long-distance power line) to the Province (of Cremona), the private applicant ("the firm") shall reach an agreement with the Distribution Network Operator (hereinafter "DNO") regarding the layout of the long-distance power line. In order to favour such agreement, when the firm submits the concession application for water diversion and, thus, long before the submission of the power plant application to the Province of Cremona, it should also ask the DNO for a solution regarding the connection to the grid. Following such request, and within 20 to 60 days under the resolution issued by the Regulatory Authority for Electricity (hereinafter "AEEG") no. 99/2008, the DNO suggests a technical solution named Soluzione Tecnica Minima Generale (General Minimum Technical Solution – hereinafter "STMG") for the connection to the grid, which also comprises a cost estimate of the works to be carried out and to be borne by the applicant firm. The STMG comprises a general list of minimum works regarding modifications to existing plants or the construction of new plants, in order to connect the hydroelectric power plant to the grid. Then, the applicant firm has 45 days to confirm the suggestion and can choose between two different solutions to start the authorization procedure for electric lines construction.

h) A transparent administrative procedure: law no. 241/1990 has introduced the principles of transparency and participation into the work of the public administration; such principles have, then, been adopted within special field rules. One of the most significant elements of the over-mentioned law is the calling of the Conference of the Concerned Bodies: by summoning a single meeting, all relevant parties are required to express their opinion. This makes the administrative procedure more efficient for the benefit of the applicant who interacts with only one authority. This is a considerable advantage in that procedure time decreases and projects are subject to a more thorough and transparent assessment; gathering the Bodies around the same table, where they can make their comments on the submitted project, allows each participant, who nonetheless is required to assess aspects connected to its expertise, to have a broader and more general view on the problems connected to the carrying out of the work. At the same time, you do not run the risk that one Body requests integrations that are not within its competence, but within the competence of another Body, which, however, being at the meeting, can intervene and find an agreed solution.

Most important conflicts linked to the use of water

The Italian regulations are centred around the public use of water, so it is responsibility of the public administration to manage and coordinate cases of joint use, meant as the technical, administrative and legal effort necessary to allow the coexistence of different uses, or uses pursued by different parties, of the same water.

In order to talk about joint use, it is fundamental that such joint use is technically feasible, even though through *ad hoc* solutions; this excludes the conflicts caused by competing uses, which, as already previously stated, concern the management of technically incompatible applications. The public administration is required to make a choice, that will inevitably lead to granting one concession and rejecting one or more projects considered unsuitable to exploit the resource properly.

Over the years, the use of water, triggered by various economic needs, has made the context difficult, and has developed strong conflicts between hydropower and irrigation exploitation, such as in the case of Lombardia which has a high agricultural and industrial development; that conflict already existed in the beginning of the Twentieth century (Consolidation Act no. 1775/33 was specially drawn up in order to regulate the increasing demand for energy generation), but it was generally sensed less than today due to the greater abundance of water of those days and a less monocultural agriculture, which on the opposite,

concentrates irrigation needs in a short period of time during the year.

In a territory such as Lombardia, water is the real driving force of development, both agricultural and industrial: managing water meant and means having a real political/economic power, which, as such, must be managed through solidarity and protection criteria, and making sure that the general public interest, above any other private interest, becomes the driving force of its exploitation. In Italy, such concept was acknowledged by law through a declaration according to which water is a public resource; as a consequence it is clear that the public administration is in charge of regulating the proper use of water through concession granting.

In such context, the irrigation consortia, provided for by the rule and also through forced action, are intermediaries between the public administration and the final user, and they are in charge of the technical management of the resource according to what is stated in the concession.

Until 1996 (when water was declared a public resource) there were public and private waters: public waters were controlled by the public administration and private waters were governed by private notarial deeds. Today things are different but the Bodies in charge of granting concession still have problems in realigning the situation.

The long lasting situation described above gave to some irrigation consortia the possibility to exert such a rooted power over water that they have replaced the relevant body as regards the public management of the resource.

As long as the resource was sufficient and available to meet the needs of the users, the public administration has indulged such situation and has renounced to become the only reference point for the proper management of water.

4.2. Croatia

Weak points of the different regulations

The weak points of the different regulations are:

- The process of preparing and construction of SHP is a very complex organizational process. The whole process can be divided in various phases, each phase comprising the basic legal acts resulting from activities carried out in a particular phase. Each phase consists of several activities resulting in fact that 19 basic legislative acts request a total of cca 48 activities. It is necessary to procure and pay about 67 different documents in several institutions. Part of the process is additionally complicated by duplication and repetition of documents;
- The proces is same for all renewable energy sources and for different powers of plant;
- For location permit it is necessary to demand the mark about need of carring out study about environmental impact and study about nature impact. It is not clearly defined what these demands need contain and who is responsible for them. Also criterion which determine whether are or are not necessary these studies are not clearly.
- For location permit is necessary to contribute SHP conceptual project which content and volume are not known.
- Solution of proprietary-legally relation on land is not stipulated all to demand for building permit. To then applicant invests a lots of money and has not guarantee in positive solution of proprietary-legally relation.
- Only on SHP (from all renewable energy sources) granting from 7.5% on net profit exsists.

- Water Law deetermines for SHP exceeding 5 to 20 MW concession up to 60 years while for SHP up to 5 MW concession up to 30 years.

Strong points of the different regulations

Strong points of the different regulations are:

- Water is considered as a public resource;
- All regulations are on the national level, don't on regional level;
- By work of Ministry of Economy, Labour and Entrepreneurship (MoELE) through different projects, work-shops and publications (in this number also the web site) so complex process is more understandable, transparent and straight.

Most important conflicts linked to the use of water in every country

It seems that in Croatia now is no conflict about the use of water for SHP, but conflicts are possible in the future in the next fields:

- Between the public administration and applicant (granting one concession and rejecting one or more projects considered unsuitable to exploit the resource);
- Between different current and potential users;
- In preserved area i.e. with regard flora and fauna;
- Fishing and farming;
- Water supply for different purpose;
- Tourism and recreation;
- Culture heritage, etc.

4.3. Greece

Weak points of the different regulations

The main scope of Law 3468/2006 was to simplify the licensing system for RES investments in Greece (i.e. licensing procedures). The Law reinforces a strong interest is the new electricity feed-in-tariffs system, applicable for the sales of RES-produced electricity to the grid. Thus, the Operators of electricity grids are required to connect SHP plants to the grid and purchase all of their electricity at legally-fixed minimum prices. However, grid availability is an important issue in Greece, since the areas of high wind potential are usually isolated and far from the existing grid infrastructure. So an important part of achieving the RES target is connected with the grid development projects.

According to ESHA, the licensing procedure of private small hydro plants in Greece requires consultations of various public services. Authorisations for production licenses are granted by the Ministry of Development following a positive consultation of the newly established RAE, the advisory body of the Ministry. Nevertheless, a multitude of other relevant licenses is granted by various other authorities. In addition, multitudes of laws and of ministerial orders in particular, which are continuously modified every 6-12 months, have to be obtained by the licensee. The existing legislation is not so clear regarding the allocation of duties among the various public services.

Moreover, the tax legislation is also unfavourable to the small hydropower, by accepting an annual amortization rate for such investments of only 2%. Also, the interconnection cost with the public utility networks of a private small hydroplant is normally prohibitive, provided that most of such plants are located within mountainous remote areas. The environmental terms required for the issue of a private SHP license are issued by the Ministry

of Environment-Planning & Public Works. The environmental licensing procedure faces frequently various local economic interests. Many SHP plants are located within forested areas, a fact that rather hampers the licensing procedure on behalf of the various services of the Ministry of Agriculture.

More importantly, the Greek legislation has not been fully harmonized with the Water Framework. The management of the water resources still belongs to the Ministry of Development, whereas the residual flows are defined by the Ministry of Environment, Planning & Public Works.

Strong points of the different regulations

Pricing of electricity is reasonable and very often the investment subsidy is substantial.

Most important conflicts linked to the use of water

- Cultural heritage;
- Local authorities;
- Legislation;
- Bureaucracy;
- Farming.

4.4. Norwey

Weak points of the different regulations

As mentioned in the above chapters there are two possible procedures to obtain a permission to develop hydro power:

- Simplified application to omit a concession license;
- Application for a concession license.

Obviously it is a strong point for smaller hydro power that it is possible to omit the long, tedious and not to mention the more expensive application for concession. However, the weak point about this system is that only the negative effects of the SHP are considered when deciding whether a concession license is necessary or not.

The laws and regulation are extremely strict related to preserved regions. The laws should focus on whether the development of SHP has any negative effect on the main river system, which the preservation originally was attended to. In general, if the development of SHP has no or insignificant effect on the preservation, a development of SHP should not be denied due to preservation.

Moreover, it is a serious weak point that the apparent authority is not obligated to make their final decision within a certain time frame.

Also, the laws pays little respect to the technical equipment installed in the power station as the main focus is primarily related to the environment and any possible damage to the surrounding area.

Today's regulation does not take into account the evaluation of the maximum energy output from a river. In Norway, there are examples where has been built several SHPs along a river course using the same amount of water. Building one large power plant would have given less environmental impact and higher energy output. However, it may give better economy for each SHP.

Strong points of the different regulations

One strong point in particular is that the applicant only has to relate to one authority, namely NVE, regarding any possible permission related to development of SHP.

In addition, the applicant does not have to apply for one concession to use the water, one concession to develop hydro power and finally one concession to connect to the grid. The applicant only composes one application to develop hydro power, and if the permission is granted, automatically the applicant has the permission to use the water, build the power station (including the intake and the piping) and connect to the grid. This is an effective way of evaluating an application and development of SHP as a whole.

Most important conflicts linked to the use of water in every country

The conflicts linked to the use of water in Norway are linked to the following:

- Preserved area;
- Fish, especially salmon;
- Flora and Fauna;
- Water framework directive;
- Water supply;
- Public interests (tourism, recreation, etc.);
- Lapp interests;
- Culture heritage.

Also, when regarding hydro power there is a huge challenge related to the grid. In several regions the grid is experiencing an overload and a large investment is necessary to reinforce the grid in order to receive new production. As mentioned in the chapters above this cost the applicant has to cover.

4.5. Austria

General remarks to the weak and strong points of the existing legislation and legal procedures in Austria

It is seen as a strength that the starting conditions for all consensus applicants are equal.

In particular planning engineers and plant operators consider the hitherto long duration of permit issuing procedures including all preparatory steps a weakness. In addition, several stakeholders state critically that not only at operator side but also at public authority side the required professional expertise is not always in place.

It is not easy to point out single strong and weak sides in questions of conflicts in water utilization issues. A critical remark expressed particularly by planning engineers is that among public servants there are very different individual opinions in terms of ecological assessment of SHP plants, which leads to uncertainty and makes it hard to avoid or solve conflicts. Differing opinions expressed by public authority representatives in public are being recognized; in case of conflicts appearing during the permission procedure, conflict parties make use of such discrepancies in order to strengthen their own positions.

Groups of questions

Subdivision of watercourse-related property rights into private and public ones: The differentiation into public and private water-bodies according to § 2 and 3 of the Austrian Riparian Rights Act WRG is of little importance, as in Austria only a small number of private

water-bodies exist. It is important to state whether in a certain case there is a "public riparian good" according to § 4 of the WRG (this means a water-body owned by the State). Water would always cover land, and all land in Austria is being owned by owners. The administrators of public riparian goods would almost always permit the use of the utilization of the land – however in some cases, not free of charge. On the other hand, private owners use to sometimes show certain reservation against permitting the use of the land below the water by other persons. In most cases it will be easier to build a hydro-power station which uses public riparian good than to use private watercourses.

Indemnification of owners ore holders of utilization rights in cases of interference into their existing rights by the public Riparian Authority as a sovereign: Basically it is welcomed that in cases of such interference a possibility for compensation is foreseen. Yet this possibility is being hardly ever applied. When acting as a sovereign, the Riparian Authority (the state) may interfere into existing rights only in order to safeguard public interests. For the time being, the Austrian Riparian Act does not consider small hydro-power to be a case of eminent domain.

Exclusive sovereignty of the Riparian Rights Authority in terms of all waterbodies and all kinds of water utilization and hydraulic engineering activities: It is favorable to have a jurisdiction in which only the Riparian authority alone is exclusively in charge of all kinds of water utilization related to all waterbodies. This brings about that there is only one contact partner responsible and no competence conflicts can arise.

Division of competences in Austria between the state and the Länder: It may look as an anachronism that a country as small as Austria is made up of as much as nine federal states. Anyway, important laws such as the Riparian Act are Federal laws which have to be executed by the Länder. According to the specific situation within the various Länder different interpretation priorities might arise, but still the essential content of all federal laws must be accepted and executed in all Länder in a very similar - almost in an identical - way. Planners and plant operators who are active in more than just one Austrian Land have to meet the challenge of coping with differences in federal law interpretations. They are not that grave that they would refrain from working in more than one Land, but they can cause surprises, complications and delays. The competences which stay with the Länder bring about a closer interconnection between citizen and Land administration than would be possible in a centrally administrated country. In the end of the day the federal structure of Austria brings about more advantages than drawbacks.

Federal and regional responsibility for legal matters to be taken into consideration in permitting procedures: In permitting procedures, the Länder hold the competence for only one relevant law – the Construction Act (Bauordnung). Efforts have been undertaken – and meanwhile have developed into a rather advanced state – to unify the various Construction Acts and there is some hope that the Federal Framework Construction Act for the whole of Austria might be enacted in the near future.

Clarity of framework conditions and regulations (e.g. a definite catalogue of ordinations) versus leeway for personal law interpretation of public servants in charge of juridical, technological or environmental issues: In Lower Austria, the public authority's experts for technological and ecological issues attempt to achieve standardized procedures and to coordinate their approach with their colleagues of the neighbouring Länder. Due to considerable climatic, orographical and hydrological differences, there can be no absolutely standardized way of acting all across the whole of Austria, and not even all across Lower Austria.

„Ban on *reformatio in peius*" and „good ecological state" – as an underlying ecological principle: The ban on *reformatio in peius* (on deterioration) is laid down in §30a of the Riparian Act in a binding way and cannot be discussed. This does not mean, however,

that no new hydrological engineering activities would be possible. This ban means only that a measure will not receive a permit in case it is going to deteriorate the overall water quality of a water body (the length of which can be mostly measured in several kilometres) with quality being measured as a bundle of four quality criteria.For the implementation of this ecological approach in project assessment procedures in Austria the funding has already been laid. The same paragraph even states a demand to even improve the situation by each new measure. For the time being the implementation phase of these new regulations of the Riparian Act is continuing and it might still take years to establish harmonized procedures. This means that for quite a long while work will keep on following the principle „try and error“ in spite of all high-end scientific research being done.

Assessment criteria in riparian and nature preservation-related decision making: Without taking into account the positive effects of reduced fossil energy consumption, of carbon emission reduction of CO_2 and of reduction of other adverse environmental impacts.

Among public servants acting as experts for nature preservation and riparian right, but also among environmental politicians the opinion that water would be more important for people's lives than energy, can still be heard frequently. Such an opinion gives proof of a restricted understanding of energy, which is just as little helpful for the creation of sustainable life conditions as a restricted understanding of the meaning of water for the life of the population. Without energy, there is no life, just as there is no life without water. Discussing the question whether energy or water would be of greater importance for hunan life resembles a discussion about whether the hen or the egg came first – it does not make sense.

When one puts the importance of water above everything else, one ends up with the logical consequence that one will judge on the usefulness of a new hydro-power plant just by assessing ist impact on the quality of a certain part of a watercourse without taking into account the impact of the new plant on the substitution of fossil energy, nor ist contribution to the reduction of negative impacts of energy production on climate and environment.

In an analogy, in Austrian permit edition procedures for new photovoltaic plants one may face the situation that the impact of the new plant on cultural heritage protection and townscape is being taken most seriously and might lead to the rejection of the project. When deciding on projects for new wind-turbines, Austrian authorities sometimes appraise the protection of presumably endangered birds and landscape more highly than the positive effect of cleaner energy production, and when permits for biomass-operated heat-lines are at stake, the protection of forests is weighted more important, and in negotiations on new biogas plants the protection of neighbors from noise and smell possibly emitted by the plant and by transport vehicles is esteemed a higher good than the near-to-zero-carbon energy produced.

Of course, it is justified and important to take all effects of each measure into account and to duly weigh all positive and negative impacts. But the fact that the ecological impact on energy production very often remains outside of the scope of such deliberations, bears in itself some implicit favoring of fossil energy production. Fossil energy economy in total causes much graver adverse environmental impacts on soil, water, air and finally on animals and humans which are not being looked at during the permitting procedures.

Issues such as changes of regional precipitation regimes as a part of ongoing climate change, the erosion of soil and the sinking of groundwater horizons influence the environment and our watercourses more harmfully than the construction of small hydropower plants ever could; still when it comes to permission procedures for new hydropower stations (or for new wind turbines of solar power stations), they are treated as issues of no relevance.

Ranking of priorities within the scope of water-related issues: flooding prevention, ecologization (including, in particular, the Water Framework Directive), green energy production – in Austria and especially in Lower Austria

Flood protection and ecologization are laid down precisely in the Riparian Act (no

permits can get issued for projects which might lead to increased danger of flooding, there is the clear aim to achieve a "good ecological state" respectively a "good ecological potential" in all watercourses. The production of green electricity is to be welcomed and is a necessity for the future, yet it just ranks third in this list of priorities.

One-stop-shop permit edition: Attempt of the responsible authorities to cluster the procedures which lead to the issuing of the permits necessary for hydropower plant construction to one concentrated procedure – in this case the procedure related to nature protection is being clustered with the one concerning riparian rights.

Is already being practiced in Lower Austria; experience been made in this respect is good.

Water information system of the Federal Länder: Easy access to riparian data-bases for everybody who is interested. It is a reliable source of information and valuable for all stakeholders.

Water registry: An official documentation about all water-related rights – easily accessible by everybody, complete evidence of all riparian rights. Similar to the water information system, it is an excellent and reliable source of information.

Denomination as a Green Energy production plant – by the Land governor: Such a denomination is based on an individual decision in the respective Land. It would be better to have a pan-Austrian standardized procedure for this case. As to decision duration, this procedures is not time-consuming and in most cases would just take a week or two.

Access to the grid by electricity feed-in: The grid operator defines a point in his mains and hands the rights to feed electricity into it to the plant operator. It is a frequent case that the persons in charge of the SHP plant permit edition show little familiarity with the topic. An inter-disciplinary manual for this staff should be designed and applied. If at the side of the planners sufficiently qualified and experienced experts will be acting, it will be possible to obtain feed-in regulations for electricity from SHP plants in close cooperation with grid operators.

Public funding from Land and Federal level, feed-in tariffs: Also in respect to questions of available national and regional funding and of applying feed-in tariffs among officials responsible for SHP plant permit procedures, one can frequently find only rather limited information this relates to the nature preservation department just as it applies to the riparian department.

Helpful guidelines as good practice manuals for existing and future plant operators from all Austrian regions - specific situation in Lower Austria: The guidelines are considered very helpful not only by the representatives of the relevant public authorities, but also by power-plant operators and by those intending to become plant operators. In regions in which such guidebooks are not yet available, one can often hear the wish to have them in place as soon as possible. Most of the experienced planners would have a different view on these guidelines. Quite many of them claim to treat each plant as a special case and thus put forward the opinion that such guidelines are not reasonable. This can be understood from their individual point of view. Being experts, they know what it is all about when it comes to SHP plant planning.

Public contact points for operators of projects and plants at various levels: municipalities, county administration, various relevant departments (e.g. construction department) of Land administration. A main source of discomfort at the side of both planners and plant operators during the past years has been the multi-stage decision making structure, giving a role to various public bodies at various levels from local to federal. One thing that was criticized was the often poor quality of their communication flows. The other negative point often mentioned is that especially at the municipal level there is a shortage of persons who are sufficiently familiar with questions related to small hydro-power.

Private contact points: SHP Operators' Association („Verein Kleinwasserkraft") as a professional association, lobby and advisor; NGOs such as regional Energy Agencies should serve as regional turning points for information and networking. In this respect it is interesting that quite many public servants dealing with SHP had no notion of the existence of such private institutions, respectively they know that they exist but hardly ever perceive or monitor their activities. Both plant operators and planning engineers are familiar with the activities of the Austrian SHP Association „Verein Kleinwasserkraft Österreich" and appreciate them and the work of its elected national and regional representatives. Existing and prospective operators of small hydro-power plants also know about the existence of other NGOs such as energy agencies; they contact these NGOs asking for advice, depositing ideas and problems. These private bodies are often found suitable to act as intermediates, and they procure contact addresses and start-up information for beginners. On the other hand, planning engineers and authorities hardly recognize their presence, and some of them who are less familiar with the issue tend to estimate their role as not helpful. In connection with rather technocratic approaches of some planners and officials, the potential positive role of regional contact points as unbiased advisory support and as conflict mediators of this kind is often strongly underestimated.

Master-plan SHP for Lower Austria (Niederösterreich) 2009: This strategy paper issued by the Lower Austrian Land administration is seen positively and as a step in the right direction. The master-plan is a tangible political good will statement declaring commitment in respect to an increased SHP utilization . Thus it show the direction to take to representatives of public authorities and to politicians who release jurisdiction and by-laws just as well as to operators of small power-plant s and those willing to operate plants.

Procedure duration: The whole duration of all procedures for the issuing of plant construction and operation permits in the above mentioned one-stop-shop procedures is between two and three months, provided that the project has been duly prepared in advance and that the draft versions of this project have been regularly discussed with the authorities' experts during their regular consultation days. The administrative costs attached to this procedure in this case are comparably low. As it will often be true, the devil sleeps in the details also in this case. It is not always easy to "duly prepare" a project. I happens frequently that this preparatory stage takes a very long time.

Public relation: In respect to small power plants show considerable room for improvement. Especially, the side of the „Greens" needs to be convinced. Still now, from their side very often just cold wind is blowing. And quite often one can experience that they lack basic information on technological and ecological facts and circumstances. In many well-known cases of small hydro-power projects one ends u p with the impression that their basic interest is just the spoiling of the project without regard to the question which alternative will be the most favourable for the environment.

5. Conclusion

In conclusion will be presented sugestions for improvement of normatives, institutional procedures and environmental issues with aim at elimination of non-technical barriers for the expansion of small-scale hydro electricity (SHP) production in Europe. Suggestion, obtained on the basis of analysis of strong and weak points of the different regulations in partner countries presented in previous chapter are the next:

Suggestion the use of conference of concerned bodies for other countries

One of the most significant elements is the calling of the Conference of the Concerned Bodies: by summoning a single meeting, all relevant parties are required to express their opinion. This makes the administrative procedure more efficient for the benefit of the applicant who interacts with only one authority. This is a considerable advantage in that procedure time decreases and projects are subject to a more thorough and transparent assessment; gathering the Bodies around the same table, where they can make their comments on the submitted project, allows each participant, who nonetheless is required to assess aspects connected to its expertise, to have a broader and more general view on the problems connected to the carrying out of the work. At the same time, you do not run the risk that one Body requests integrations that are not within its competence, but within the competence of another Body, which, however, being at the meeting, can intervene and find an agreed solution.

To fix a list of documents:
1) *essential preliminary documentation;*
2) *and after conference of concerned bodies the detailed documents*

The definition of rules that precisely list the documents to attach to the applications regarding water diversion concession and regarding the authorization to build the power plant is held necessary; in particular, such rules should define:

- The technical documents necessary for both the diversion concession application and for the authorization to build and operate the plant;
- The technical documents necessary to authorize the power line;
- The documents to attach to the applications so that, as contents are concerned, they can be extended to all those aspects that, during examination, will be dealt with also by the other Bodies required to issue their opinions and, until today, to issue documents propaedeutic to the granting of concessions and authorizations connected to the construction and commissioning of the plant;
- The technical contents necessary to assess technically incompatible applications (competing applications), and for each of them arranging a weighing method that allows to make a choice as free as possible from the discretionary power of each examiner. In particular, the most consistent parameters to establish the technical-economic skills of the applicant should be precisely defined; the rules require that such skills are assessed when choosing competing applications.

Fix a time limit to the time of the procedures from the presentation of the application until the authorization to build and operate the plant (water concession procedure included)

The whole duration of all procedures for the issuing of plant construction and operation permits in the above mentioned one-stop-shop procedures is between two and three months, provided that the project has been duly prepared in advance and that the draft versions of this project have been regularly discussed with the authorities' experts during their regular consultation days. The administrative costs attached to this procedure in this case are comparably low. As it will often be true, the devil sleeps in the details also in this case. It is not always easy to "duly prepare" a project. I happens frequently that this preparatory stage takes a very long time.

Master plan concerning water use for power generation

This strategy paper issued by the Lower Austrian Land administration is seen positively and

as a step in the right direction. The master-plan is a tangible political good will statement declaring commitment in respect to an increased SHP utilization . Thus it show the direction to take to representatives of public authorities and to politicians who release jurisdiction and by-laws just as well as to operators of small power-plant s and those willing to operate plants.

Suggestion for different procedures in according to the size of the plant (100 kw)

This is the first non-technological barrier to the development of mini hydropower plants because the general procedure for granting water use concession is rather complex both as regards the documents to submit and the procedures to go through; the applicant is thus required to bear a considerable economic commitment which makes some types of plants (mainly micro hydropower plants up to 100 kW) economically unsustainable. Among them are the micro hydropower plants, located along secondary water networks created for irrigation purposes, that do not take water away but return it at an elevation useful for irrigation. Often, micro power plants are only aimed at self-generation and are connected to the power box of the house located in the area of the power plant; the low levels of energy generation added to the considerable difficulty to obtain water use concession lead the people interested to give up the idea regarding it as economically unsustainable.

Expecially state support for SHP

Financial support related to hydro power must be introduced in Norway.The Norwegian Government has for many years now promised financial support related to renewable energy such as for instance hydro power. The Government stated that hydro power plant developed in 2004 or later were to receive financial support in terms of Green Certificates, but due to an unstable political situation related to this subject financial support has not yet been introduced in Norway.

In Austria, also in respect to questions of available national and regional funding and of applying feed-in tariffs among officials responsible for SHP plant permit procedures, one can frequently find only rather limited information this relates to the nature preservation department just as it applies to the riparian department.

A common unification of licences procedures (water permission, power plant, power line)

The process of preparing and construction of SHP is a very complex organizational process. The whole process can be divided in various phases, each phase comprising the basic legal acts resulting from activities carried out in a particular phase. In case of The Republicf of Croatia each phase consists of several activities resulting in fact that 19 basic legislative acts request a total of cca 48 activities. It is necessary to procure and pay about 67 different documents in several institutions. Part of the process is additionally complicated by duplication and repetition of documents;

Quality logistics in licensing (website)

The following proposal is emerging as the natural development of the over-mentioned regulatory strategy. Once the body in charge of the whole examining procedure necessary to build and commission the hydropower plant has been defined through the relevant regulations, it is advisable that such body takes upon itself the creation and the updating of an interactive website, first of all addressed to the public Bodies involved in the procedure, but also to private interested entities.

The website should comprise the following information:

- Current regulations: European, national, regional or local (rules);
- Procedures established for the different types of plants (in case different types are planned);
- List of Bodies involved in the administrative procedure according to the type of application and location of the plant. It would also be useful to make reference to the technical aspects on which they have competence, with a link to the specific rules to consider when examining hydro power plants;
- List of the documents accompanying the diversified application for each type of plant along with the main criteria implemented for their assessment and weighing;
- General reference to costs and time owned to the public administrations in order to attain the authorization to build and operate the plant;
- Reference/link to certified sites holding databases useful to examine plant feasibility (e.g. Water Use Register, environmental monitoring networks – ARPA, hydrographic flood warning services – A.I.PO, etc.).

The creation of such a website would have the advantage to overcome those administrative and technical difficulties that are not a real, concrete obstacle to plant construction, but that in fact are the main cause of the non-development of the mini hydropower sector.

For the grid owners: forse to connect the shp to the electrical grid

The recent resolution no. 99/08 of the Regulatory Authority for Electricity in Italy (hereinafter A.E.E.G.) has introduced some important innovations as regards the private entities who apply for the authorization to build both the power plant and the long-distance power line. The private entity can also submit the authorization application to modify the existing public Grid to the provincial offices, whereas such application is usually submitted by the power company. The power company and the private entity can reach an agreement so that the private entity submits both the applications to modify the Grid and to build the power plant. After obtaining both authorizations, the private entity refers back to the power company and requires the construction of the authorized works and a detailed quotation. The initial assessment of the formulas comprised in the over-mentioned resolution reveals that the quotation required by the power company is, on average, higher than the quotation that was required before the introduction of such resolution.

Public contact points: the suggest to promote the best site and after open a call for tenders

Public contact points for operators of projects and plants at various levels – municipalities, county administration, various relevant departments (e.g. construction department) of Land administration.

Local administration bodies do possess legal competence in permit issuing procedures, but very often they lack the necessary expertise. In this situation, the unification of the majority of construction-related legal regulations will be valuable. In the end of the day it will be necessary not only to simplify and unify procedures, but also to train the public servants in charge of decision preparation and/or to delegate expert work to external experts in order to close the remaining knowledge gap.

Horizontal and vertical information flows between various public institutions are not always well developed. In order to improve this inter-administrative co-operation, efforts leading to improved frictionless and harmonized procedures will have to be undertaken.

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